CLAIMS

What is Claimed is:

1. A fluid ejection device comprising:

a plurality of fluid ejecting elements, each fluid ejecting element controllable to conduct electrical current between a supply voltage and a reference voltage, wherein up to all fluid ejecting elements of a group of the plurality of fluid ejecting elements are configured to conduct during a time period, with each conducting fluid ejecting element having a corresponding fluid ejecting voltage when conducting; and

a feedback circuit configured to provide a feedback voltage substantially equal to an average of corresponding fluid ejecting voltages at the fluid ejecting elements that are conducting.

2. The fluid ejection device of claim 1, wherein each fluid ejecting element is coupled between a shared supply path at the supply voltage and a shared return path at the reference voltage and to a separate control line, wherein each fluid ejecting element is configured to conduct electrical current from the shared supply path to the shared return path in response to a signal received via its separate control line.

3. The fluid ejection device of claim 2, wherein the feedback circuit comprises:

a supply sense line;

a reference sense line;

a plurality of supply sense switches each corresponding to a different one of the plurality of fluid ejecting elements and coupled between the supply sense line and the shared supply path at substantially a same location where the

corresponding fluid ejecting element couples to the shared supply path, and having a control gate coupled to the corresponding separate control line; and

a plurality reference sense switches each corresponding to a different one of the plurality of fluid ejecting elements and coupled between the reference sense line and the shared return path at substantially a same location where the corresponding fluid ejecting element couples to the shared return path, and having a control gate coupled to the corresponding separate control line, wherein each supply sense switch and reference sense switch respectively ties the supply sense line to the shared supply path and the reference sense line to the shared return path in response to the fire signal received via the separate control line.

4. The fluid ejection device of claim 3, wherein the feedback circuit further comprises:

a differential amplifier having a non-inverting terminal coupled to a first and second end of the supply sense line, an inverting terminal coupled to a first and second end of the reference sense line, and an output providing the feedback voltage at an output terminal.

5. The fluid ejection device of claim 1, wherein the group of N fluid ejecting elements and the feedback circuit are formed on a thin-film structure formed on a substrate including a non-conductive material selected from a group consisting of an oxide formed on a metal, carbon composite material, a ceramic material, and glass.

6. The fluid ejection device of claim 1, wherein the reference voltage comprises a ground reference.

7. The fluid ejection device of claim 1, wherein the group of N fluid ejecting elements is configured as a row that extends substantially for a width of a of print media to be inserted into a fluid ejection assembly including the fluid ejection device.

8. The fluid ejection device of claim 1, wherein each of the N fluid ejecting elements is configured to conduct electrical current in response to a separate fire signal and wherein the feedback circuit is configured to couple across each conducting fluid ejecting element based on the separate fire signals.

9. The fluid ejection device of claim 1, further comprising:

a voltage regulator configured to regulate the supply voltage, the voltage regulator configured to compare the feedback voltage to a predetermined voltage and to adjust the supply voltage based on the comparison of the feedback voltage to the predetermined voltage.

10. The fluid ejection device of claim 1, wherein the fluid ejection device is configured to provide the feedback voltage to a voltage regulator external to the fluid ejection device and to receive the supply voltage from the voltage regulator, wherein the supply voltage is varied based the feedback voltage.

11. A fluid ejection device comprising:

a plurality of resistors;

a group of the resistors, each resistor controllable to provide energy to a fluid, wherein up to all resistors of the group are configured to provide energy to the fluid during a time period, with each resistor having a corresponding voltage when providing energy; and

a feedback circuit configured to provide a feedback voltage substantially equal to an average of the voltage of each resistor that is providing energy.

12. The fluid ejection device of claim 11, wherein each resistor is coupled between a supply voltage and a reference voltage and to a separate control line, wherein each resistor is configured to conduct electrical current from the shared supply path to the shared return path in response to a fire signal received at a logic element that is coupled with the resistor via a separate control line.

13. The fluid ejection device of claim 12, wherein the feedback circuit comprises:

a supply sense line;

a reference sense line;

a plurality of supply sense switches each corresponding to a different one of the plurality of resistors and coupled between the supply sense line and the shared supply path at substantially a same location where the corresponding resistor is coupled to the shared supply path, and having a control gate coupled to the corresponding separate control line; and

a plurality of reference sense switches each corresponding to a different one of the plurality of resistors and coupled between the reference sense line and the shared return path at substantially a same location where the corresponding resistor is coupled to the shared return path, and having a control gate coupled to the corresponding separate control line, wherein each supply sense switch and reference sense switch respectively ties the supply sense line to the shared supply path and the reference sense line to the shared return path in response to the fire signal received via the separate control line.

14. The fluid ejection device of claim 13, wherein the feedback circuit further comprises:

a differential amplifier having a non-inverting terminal coupled to a first and second end of the supply sense line, an inverting terminal coupled to a first and second end of the reference sense line, and an output providing the feedback voltage at an output terminal.

15. The fluid ejection device of claim 11, wherein the group of resistors and the feedback circuit are formed on a thin-film structure formed on a substrate including a non-conductive material selected from the group consisting of one of an oxide formed on a metal, carbon composite material, a ceramic material, and glass.

16. The fluid ejection device of claim 11, wherein the group of resistors are configured as a row that extends substantially for a width of a print media to be inserted into a fluid ejection assembly including the fluid ejection device.

17. The fluid ejection device of claim 11, wherein each of the resistors are configured to conduct electrical current in response to a separate fire signal and wherein the feedback circuit is configured to couple across each conducting resistor based on the separate fire signals.

18. The fluid ejection device of claim 11, further comprising:

a voltage regulator configured to regulate the supply voltage, the voltage regulator configured to compare the feedback voltage to a desired voltage and to adjust the supply voltage varied based on the comparison of the feedback voltage to a desired voltage.

19. A method of operating a fluid ejection device having a plurality of resistors controllable to conduct electrical current between a supply voltage and a reference voltage, the method comprising:

enabling a group of the plurality of resistors to conduct electrical current;

conducting an electrical current through up to all resistors of the group, each conducting resistor having a corresponding voltage; and

determining a feedback voltage substantially equal to an average of selected corresponding voltages.

20. The method of claim 19, further comprising:

comparing a desired voltage to the feedback voltage; and

adjusting the supply voltage based on the comparison of the desired voltage to the feedback voltage.

21. The method of claim 20, further comprising:

increasing the supply voltage when the desired voltage exceeds the feedback voltage; and

decreasing the supply voltage when the feedback voltage exceeds the desired voltage.

22. The method of claim 19, wherein the enabling of the group of the plurality of resistors to conduct electrical current and the conducting of an electrical current through up to all resistors of the group is performed during an ejection operation, the method further comprising:

enabling a different group of the plurality of resistors for each subsequent ejection operation.

23. The method of claim 22, further comprising:

forming a different enabled group for a subsequent ejection operation by disabling a resistor of the enabled group for a previous ejection operation and enabling a resistor not included in the enabled group for the previous ejection operation.

24. A fluid ejection device having a plurality of fluid ejecting elements controllable to conduct electrical current between a supply voltage and a reference voltage, the fluid ejection device comprising:

a means for enabling a group of the plurality of fluid ejecting elements to conduct electrical current;

a means for conducting an electrical current through up to all fluid ejecting elements of the group, with each conducting fluid ejecting element having a corresponding fluid ejecting voltage; and

a means for determining a feedback voltage that is substantially equal to an average of selected corresponding fluid ejecting voltages.

25. The fluid ejection device of claim 24, further comprising:

means for comparing a desired voltage to the feedback voltage; and

means for adjusting the supply voltage based on the comparison of the desired voltage to the feedback voltage.

26. The fluid ejection device of claim 25, further comprising:

means for increasing the supply voltage when the desired voltage exceeds the feedback voltage; and

means for decreasing the supply voltage when the feedback voltage exceeds the desired voltage.

27. A fluid ejection assembly comprising:

a plurality drop ejecting elements arranged in a plurality of zones, with each zone having at least one drop ejecting element, wherein the drop ejecting elements of each zone are configured to conduct electrical current between a corresponding supply voltage and a corresponding reference voltage, and wherein up to all drop ejecting elements of a group of the group of N drop ejecting elements are enabled to conduct at a given time, with each conducting drop ejecting element of the enabled group having a corresponding drop ejecting voltage; and

a zone controller configured to provide a corresponding desired supply voltage for each zone based on at least one corresponding zone parameter of each zone; and

an energy controller configured to couple across each conducting drop ejecting element of the enabled group and configured to regulate the supply voltage for each zone based on selected corresponding drop ejecting voltages and on each zone's corresponding desired supply voltage.

28. A method of operating a fluid ejection assembly having a plurality of drop ejecting elements:

arranging the plurality of drop ejecting elements into a plurality of zones with each zone having at least one drop ejecting element, wherein the drop ejecting elements of each zone are configured to conduct electrical current between a corresponding supply voltage and a corresponding reference voltage;

enabling a group of the plurality of drop ejecting elements to conduct electrical current for an ejection operation;

conducting an electrical current through up to all drop ejecting elements of the group, each conducting drop ejecting element having a corresponding drop ejecting voltage;

providing a corresponding desired supply voltage for each zone based on at least one corresponding zone parameter of each zone; and

regulating the supply voltage for each zone based on selected corresponding drop ejecting voltages and each zone's corresponding desired supply voltage.